TWO NEW SPECIES OF CYPERACEAE FROM PENINSULAR INDIA

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ABSTRACT

Two new species, **Cyperus karthikeyanii** (from Karnataka) and **Fimbristylis naikii** (from Maharashtra and Andhra Pradesh), are described and illustrated. Keys to distinguish the new species of *Cyperus* and *Fimbristylis* from their allied species are also provided.

RESUMEN

Se describen e ilustran dos especies de la familia Ciperáceas nuevas para la ciencia: ***Cyperus karthikeyanii*** (procedente de Karnataka), y ***Fimbristylis naikii*** (de Maharashtra y Andhra Pradesh). Adicionalmente se proporciona una clave para separar los nuevos taxa de sus parientes cercanos en los géneros *Cyperus* y *Fimbristylis*.

INTRODUCTION

The genera *Cyperus* L. and *Fimbristylis* Vahl consist of ca. 300 and 250 species respectively and are distributed in tropical and warm regions of the world (Mabberley 1997). Karthikeyan et al. (1989) in his enumeration of Monocotyledons, listed 86 taxa (71 species) of *Cyperus* and 102 taxa (90 species) of *Fimbristylis* from India.

During the course of botanical explorations of the tropical evergreen forests in the Western Ghats, two interesting specimens belonging to Cyperaceae were collected viz., *Cyperus* (Section *Mariscus*) and *Fimbristylis* (Section *Fimbristylis*, Series Dichotomae). Based on a perusal of the literature, comparison with the herbarium collections at Herbarium of Cyperaceae, Majalgaon College, Majalgaon (HCMCM), BSI & CAL, and our own field observations, the specimens were found to be very distinct and both are described here as new species viz., *Cyperus karthikeyanii* and *Fimbristylis naikii*.

1. Cyperus karthikeyanii Wad. Khan & Lakshmin., sp. nov. (**Fig. 1**). TYPE: INDIA. KARNATAKA STATE: Udupi, 20 Sep 1999, *Sardesai s.n.* (HOLOTYPE: CAL; ISOTYPES: HCMCM, K).

Cyperus clarkei T. Cooke et *C. panicei* (Rottb.) Boeck. habitu stolonifero caulibus ad basin cormo similibus, spiculis unifructis, gluma fructifera involuta dorsaliter rotundata affinis, sed habitu tenuissimo, stolonibus tuberiferis tenuibus atque reliquiis fibrosis obtectis, spicis brevioribus (4–6 mm), nucibus aliquantum longioribus (ca. 2.5 mm) et staminibus 3 ab ambabus speciebus valde differt.

Perennials, 15–35 cm tall with tuberiferous stolons; stolons slender, wiry, 1–2 cm long, 1.25–1.5 mm thick, covered with purple-brown, strongly nerved, ovate or ovate-lanceolate scales (2.5–4 × 1–2.5 mm) which soon become fibrous; tubers ellipsoid, purple-brownish, 4–5 mm long and broad, covered with fibrous remains; stem trigonous, filiform to rather slender, 0.5–0.7 mm thick, glabrous, with often corm like or enlarged base. Leaves basal, 0.5–1 mm wide, flexuous, shorter to, as long as or rarely overtopping the stems, scaberulous on margins in upper half, caudate-tipped; sheath pale to dark purple-brownish, fibrous with age. Inflorescence of single, terminal capitate head of 2–5 sessile clustered spikes under 1 cm long and broad; involucral bracts 3–5, 1–2 setiform, the others foliaceous, the longest one 6–20 cm long, spreading or suberect, glabrous, subcylindricaly oblong, 4–5 mm long, greenish with up to 15 spikelets. Spikelets trigonous, ellipsoid, deciduous, 3.8–4 × 0.5–0.7 mm, narrowed towards both the ends, curved, whitish, tinged with purple near base or purple dotted, one flowered. Glumes 4, empty glumes 2, persistent on rachilla, broadly hyaline margined, unequal, the larger one broadly to suborbicular-ovate, ca. 1 mm long, several nerved, the second smaller one lanceolate; fruiting glumes 2, subequal, the basal one 3.8–4 × 0.7 mm, enrolled, tightly wrapping the nut, multinerved, herbaceous, acute, rounded on the back, the upper one narrowly

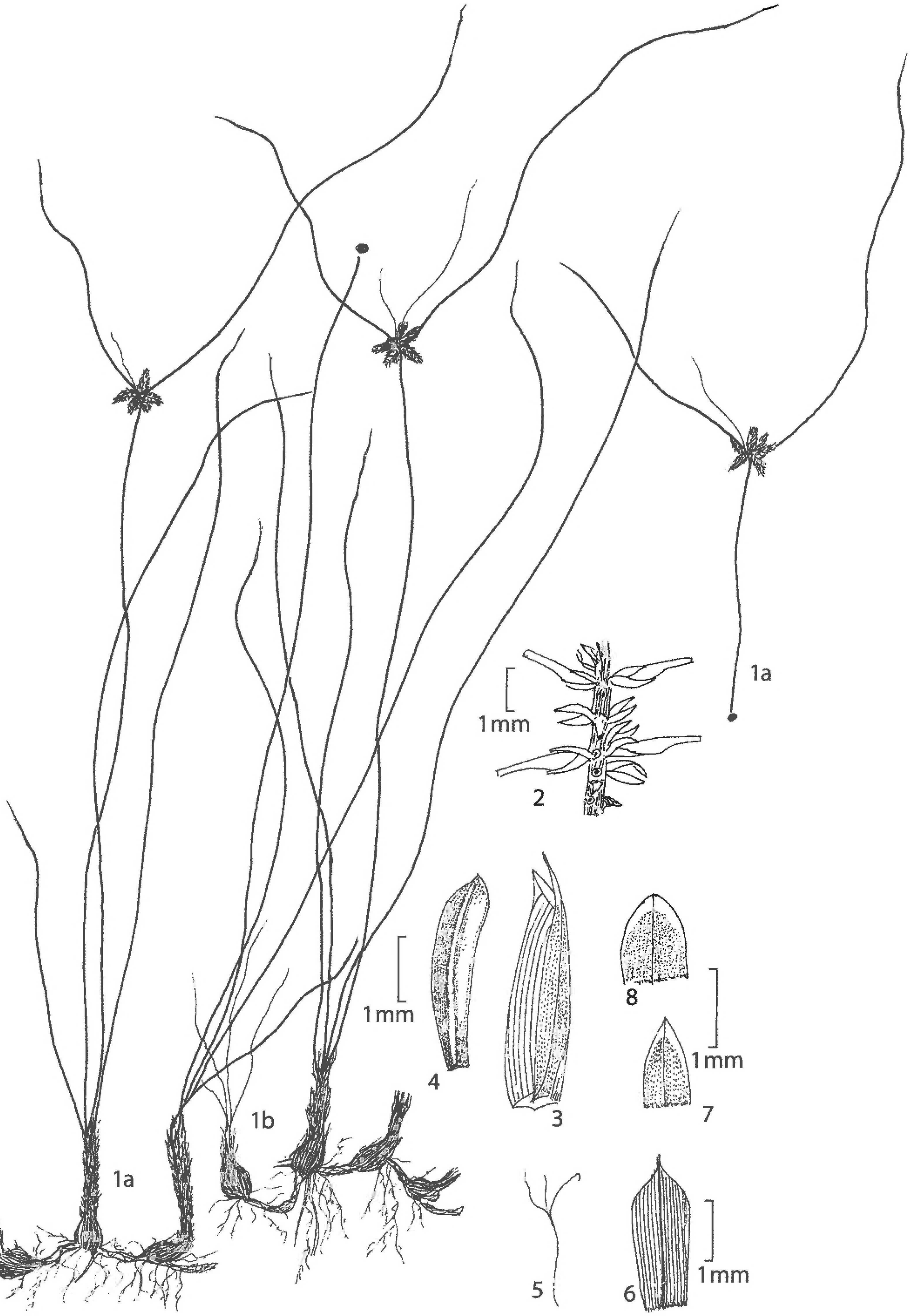

FIG. 1. *Cyperus karthikeyanii* Wad. Khan & Lakshmin. **1a–b.** Habit; **2.** Spike with spikelets and persistent empty glumes; **3.** Spikelets with fruiting glumes; **4.** Nut; **5.** Style with stigmas; **6.** Stolon scale; **7–8.** Empty glumes.

lanceolate, hyaline, uninerved, acuminate (with awn-like tip). Stamens 3. Styles 3–fid, filiform, 0.8–1 mm long, glabrous; stigmas shorter than the styles. Nuts acutely trigonous, ellipsoid-oblong, 2.4–2.5 × 0.4–0.6 mm, curved, narrowed towards both the ends, pale orange-yellow, puncticulate with isodiametric epidermal cells; gynophore obscure.

In its stoloniferous habit with usually corm-like base of stems, the one fruited spikelets and involute fruiting glume with rounded back, it shows affinities with *Cyperus clarkei* T. Cooke and *C. paniceus* (Rottb.) Boeck. but differs essentially by the extreme slender habit, the tuberiferous slender stolons covered with fibrous remains, the smaller (4–6 mm long) spikes, the some what longer nuts (ca. 2.5 mm) and the 3 stamens.

Habitat and ecology.—Occasional under shade of thick semi-evergreen forests (1000 m above m.s.l.).

Flowering and fruiting.—September-November.

Etymology.—This species has been named after Dr. S. Karthikeyan (ex Deputy Director, Botanical Survey of India) in appreciation of his contribution to the field of systematic botany.

PARATYPES: **INDIA. KARNATAKA STATE:** Londha Forest, 27 Nov 2000, *Khan 4759* (HCMCM); Ramnagar Forest, 22 Nov 2007, *Khan 1205* (HCMCM).

KEY TO NEW AND ALLIED SPECIES

1. Stolons tuberiferous, 1–2 cm long; stems and leaves filiform to rather slender, 0.5–0.7 mm thick; spikes 4–5(–6) mm long; nuts ca. 2.5 mm long ____ **C. karthikeyanii**
1. Stolons etuberiferous, 5–10 cm long; stems and leaves not filiform or if stems sometimes slender (0.5–1 mm thick in *C. paniceus* var. *paniceus*) the leaves (1–)2–6 mm wide; spikes 8–15 mm long; nuts 1.5–2.2 mm long.
   2. Stems distinctly quasi bulbosely thickened at base; leaf-sheaths straw colored; rays of inflorescence if present up to 4 mm long; nuts 1.5–1.7 mm long ____ **C. clarkei**
   2. Stems not or slightly bulbose at base; leaf-sheaths often purplish; rays if present up to 4 cm long; nuts 1.8–2.2 mm long ____ **C. paniceus**

2. Fimbristylis naikii Wad. Khan & Lakshmin., sp. nov. (**Fig. 2**). TYPE: INDIA. MAHARASHTRA: Kolhapur-Amboli Road, 18 Oct 1995, *Khan 4341* (HOLOTYPE: CAL; ISOTYPES: BSI, HCMCM, K).

Fimbristylis tomentosae Vahl valde similis sed gynophoro minore plerumque rufo-brunneo, 0.1–0.2(–0.3) mm longo latoque, nuce late obovoidea atque in superficie ordinatim subtrabeculata tuberculata, ordinatione e seriebus 15–18 verticalibus cellularum epidermalium constante, nuce ad apicem subtruncata, mutica vel obscure apiculata, spiculis 3–9 in inflorescentiam minorem dispositis differt. Ad *F. dichotomam* (L.) Vahl etiam ut videtur accedit sed glumarum lateribus multinervibus, nucibus majoribus (1.2–1.6 × 0.8–1.2 mm) atque series plus quam 15 verticales cellularum parietibus tenuibus instructis epidermalium ferentibus differt.

Annuals, 10–35 cm tall; stems slender, trigonous to compressed trigonous, 0.3–1 mm thick, ribbed, glabrous, rather rigid. Leaves ligulate, subbasal, 1–2 mm wide, 1/2 to 3/4 or more as long as the stems, flat with often thick rib-like margins, hairy with long white cilia or glabrescent, acute; sheaths densely hairy, glabrous or glabrescent, pale ferrugineus or dark brownish. Inflorescence small, simple to subcompound, 1.5–3.5 cm long and broad with usually 3–9 spikelets; rays if present 1–3, each one bearing usually paired (rarely 3) spikelets; involucral bracts up to 6, 1–2 foliaceous, the other ones setiform, the longest one as long as to much overtopping the inflorescence up to 6 cm long, long ciliate at least on margins and base. Spikelets all solitary, ovoid or ovoid-oblong, 3–7 × 2–3.5 mm, acute, brown-white variegated, many flowered; peduncles 2–5 mm long; rachilla winged. Glumes spiral, some what loosely imbricated, ovate to broadly ovate, 2–2.8 × 1.8–2.2 mm, almost as long as to slightly longer than broad, multistriate on sides, obtuse or acute, distinctly apiculate, often enrolled in fruiting, reddish-brown with whitish keel portion on the back, broadly hyaline margined; keel 3–5-nerved with strong mid nerve. Stamens 1 or 2; anthers elliptic-oblong, 0.4–0.5 mm long, apiculate. Styles flat, shorter than the nuts, 1–1.2 mm long, conspicuously broader than the staminal filaments, fimbriate throughout, not hyaline margined, pyramidally dilated at base or somewhat gradually narrowed upwards; stigmas shorter than the styles, shortly hairy. Nuts biconvex, broadly obovoid, 1.5–1.6 × 0.8–1.2 mm, turgid in the centre, subtrabeculate with 15–18 vertical striations in between transversely oblong thin walled epidermal cells, distinct in the centre and on the shoulder, nearly quadrate near base

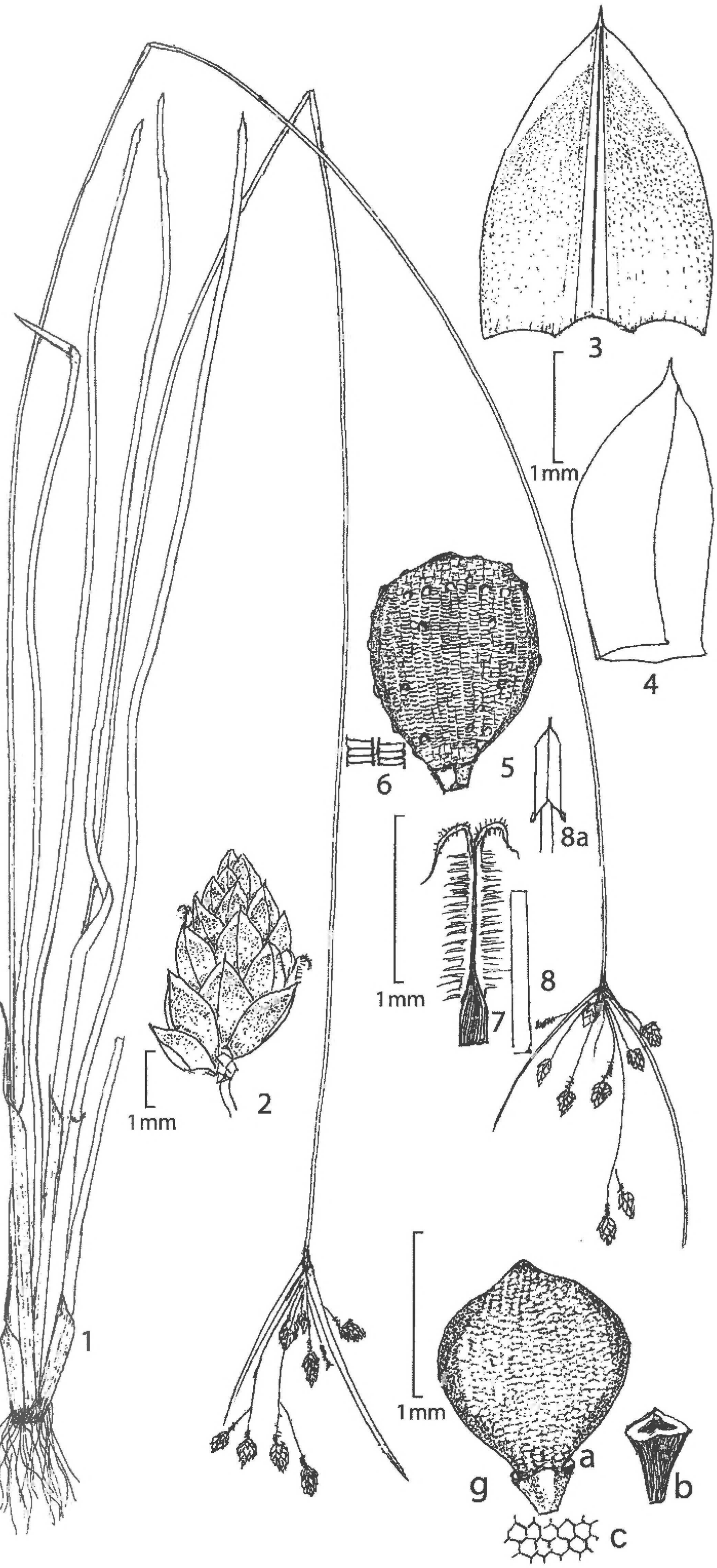

Fig. 2. *Fimbristylis naikii* Wad. Khan & Lakshmin. 1. Habit; 2. Spikelets; 3–4. Glumes; 5–6. Nut and epidermal cells; 7. Style; 8. Staminal filament; 8a. Stamen; 9a–c. *Fimbristylis tomentosa* Vahl – nut, gynophore and epidermal cells (for comparison).

and apex, and on shoulder, apex rounded to subtruncate, muticous; gynophore discoid or cupoid, small, 0.1–0.2(–0.3) mm long and broad, not or obscurely lobed, often reddish-brown (very rarely dull whitish), its thin rim often appressed to the nut base.

It is very similar to *F. tomentosa* Vahl but differs from the latter by the smaller, usually reddish-brown, 0.1–0.2(–0.3) mm long and broad gynophore, the broadly obovoid nut with subtrabeculate, tuberculate surface pattern with 15–18 vertical rows of epidermal cells, and subtruncate, muticous or obscurely apiculate apex together with 3–9 spikelets in smaller inflorescence. Apparently it also approaches *F. dichotoma* (L.) Vahl and differ in having many nerved sides of glumes, the larger (1.5–1.6 × 0.8–1.2 mm) nuts with more than 15 vertical rows of thin walled epidermal cells.

Habitat and ecology.—Occasional in wet open grassland and eutrophicated marshes.

Flowering and fruiting.—October-November.

Etymology.—The species has been named after Dr. V.N. Naik (teacher of senior author) in appreciation of his outstanding contribution in the field of taxonomy.

PARATYPES: **INDIA. MAHARASHTRA. Kolhapur District:** Shivaji University Campus, 18 Oct 1995, *Khan 4337a* (HCMCM); way to Gadhinglaj to Ajra, 11 Oct 2004, *Chavan 5314*, 5317 (HCMCM). **ANDHRA PRADESH. Medak District:** Patancheru, 30 Oct 2005, *Solanke 824* (HCMCM).

Notes.—This and other 3 taxa viz., *F. tomentosa* Vahl (= *F. podocarpa* sensu C.B. Clarke, 1893; = *F. dichotoma* (L.) Vahl subsp. *podocarpa* sensu T. Koyama, 1985; = *F. dichotoma* var. *pluristriata* sensu Napper 1971), *F. alboviridis* C.B. Clarke, and the African *F. striolata* Napper are very closely related to each other. Authors such as Clarke (1893), Kern (1974), Kral (1971), and a few others treated *F. tomentosa* distinct specifically from *F. dichotoma*.

With its smoothly subtrabeculate nut surface pattern having more than 15 fine close vertical striations or rows of thin walled cells and conspicuous tuberculations, *F. naikii* is very unlike to *F. dichotoma* or *F. merrillii* J. Kern, but somewhat approaches to *F. alboviridis* C.B. Clarke. The latter is distinguished by the smaller nuts (0.8–1 × 0.5–0.7 mm) and white-brown variegated nerveless glumes (ca. 2 mm long). The new species is undoubtedly more close to *F. tomentosa* and can be thus distinguished from the latter and other allies as under.

KEY TO NEW AND ALLIED SPECIES

1. Nuts with 15–24 fine close vertical striations or rows of thin walled epidermal cells, smoothly reticulate or subtrabeculate, usually large, 1.5–2.2 mm long; glumes distinctly nerved on sides.
   2. Gynophore large, 0.5–0.7 mm long, cupoid or obconical, often produced below, 3-lobed, whitish with thick rim distinguishable or not appressed to nut base; nuts broadly ellipsoid or suborbicular, 1.9–2.2 mm long, acutish at apex, etuberculate (rarely with 1–3 faint tubercles), reticulate from isodiametric hexagonal or rounded cells, arranged in 20–24 vertical rows or striations ____ **F. tomentosa**
   2. Gynophore small, 0.2–0.3 mm long, cupoid, not lobed, always brownish, with thin rim appressed to nut base (appearing continuation of nut-body); nuts broadly obovoid, 1.5–1.6 mm long, rounded to subtruncate at apex, densely tuberculate, subtrabeculate from some what transversely oblong or elliptic cells arranged in 15–18 vertical rows or striations ____ **F. naikii**
1. Nuts with 5–10(–12) vertical ridges or rows of thick walled transversely oblong (bar-like) epidermal cells, i.e. coarsely trabeculate, 0.8–1.2 mm long; glumes nerveless on sides.
   3. Style more or less hairy throughout the length, often hyaline margined; nuts usually etuberculate ____ **F. dichotoma**
   3. Styles glabrous or almost glabrous with sometimes few cilia at top, not hyaline margined; nuts mostly tuberculate ____ **F. merrillii**

ACKNOWLEDGMENTS

The authors are grateful to David Simpson, Royal Botanic Gardens, Kew for his valuable comments regarding the species. Help rendered by Wilmot-Dear (Melanie Thomas) and Katherine Challis, Royal Botanic Gardens, Kew for Latin diagnosis and Lourdes Rico and Patricia Malcom, Royal Botanic Gardens, Kew for the Spanish abstract is also gratefully acknowledged. The senior author is thankful to University Grants Commission for financial assistance under Minor and Major Research Projects and M.B. Gadhave, Principal, Majalgaon Arts,

Science & Commerce College, Beed for encouragement. One of us (PL) is thankful to the Director, Botanical Survey of India, Kolkata for providing facilities and to M.S. Mondal, Joint Director, Central National Herbarium, Botanical Survey of India, Howrah for constant encouragement.

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